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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,627	08/08/2005	Shigeo Shirakura	Q85332	3522

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EXAMINER	
LIAO, DIANA J	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,627	SHIRAKURA, SHIGEO	
	Examiner	Art Unit	
	DIANA J. LIAO	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "removing water from the catalyst without drying the catalyst", removing water is normally considered in the art to be equivalent to drying. The instant specification does not provide a definition of drying which would sufficiently define what is being excluded from the process as a drying step. Claim 9 is indefinite for the same reason as stated above.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittmer, et al. (US 6,241,826), optionally in view of Schneider, et al. (US 6,232,254).

Dittmer '826 teaches a process for regenerating catalytic converters, including those used for reducing NO_x gases in vented air from power plants. (col 1, lines 4-14) After pretreatment in a positive displacement reactor using water as a solvent (col 2, lines 8-15), the catalyst is transferred to an ultrasonic reactor (col 2, lines 32-37) The cleaning liquid in the ultrasonic reactor is water and the treatment is done between the freezing and boiling points of the liquid, preferably at 40-80ºC. (col 2, lines 51-57) If there are still residues on the catalyst, it is further rinsed with a liquid, such as distilled water or tap water. (col 2, lines 58-64) In an exemplary embodiment, Dittmer '826 teaches the use of distilled, described also as demineralized water with no additives, for pretreatment, rinsing, ultrasonic treatment, and further rinsing. (col 3, lines 17-21, 52; col 4, lines 28, 36, 53) This distilled, demineralized water, with no additives, is interpreted to be as pure as possible and have no chlorine or cleaning components therein. The water from the treatment steps are sent to a wastewater treatment system. (col 3, lines 45-48) The treatment time in the positive displacement reactor is at least 5 hours (col 4, lines 1-2) and the time in the ultrasonic treatment is 15 minutes, though it is dependent on the level of soiling (col 4, lines 41-46). After the final rinsing step, the catalytic converter is dried until the relative humidity is satisfactory (col 4, lines 57-62), thus removing the water. The temperature in the positive displacement reactor is from

25-35ºC. (col 4, lines 13-14) The term "ambient temperature" as defined by the instant application is a temperature within the range of about 5ºC and 40ºC (page 17) and thus the temperatures taught in Dittmer '826 fall within the definition. Dittmer '826 teaches the catalyst converters to be fully immersed during the pretreatment in the positive displacement reactor. (col 3, line 55)

Both the positive displacement and ultrasonic treatment steps involve immersing the catalytic converter module into distilled or demineralized water for an allotted amount of time. The temperature ranges of both steps overlap or touch the claimed temperature range.

Dittmer '826 is silent regarding the regeneration water without performing a heavy metal treatment step. Dittmer '826 also does not teach immersing the catalyst until bubbling stops, using the regeneration water repeatedly before wastewater treatment, or assessing the catalyst for performance before installing the catalyst back into a flue gas apparatus. Dittmer '826 also does not teach that the catalyst is not dried before reinstallation into the NO_x removal apparatus.

Regarding the time during treatment, either the ultrasonic treatment or positive displacement step is considered to be equivalent to the claimed regeneration step. The claimed process uses open language, and does not exclude the extra steps as recited in Dittmer '826. The ultrasonic treatment is performed within the claimed time duration. However, even if the time were not within the range, such as the step within the positive displacement reactor, it would have been obvious to one of ordinary skill in the art to perform the treatment for as long as necessary to achieve desired regeneration. If the

necessary regeneration in a given application is not as complete as another, it would have been obvious to use a shorter treatment time.

The lack of a heavy metal treatment step is found to be inherent or obvious in view of Dittmer '826. If there is no need to remove the heavy metals, such as if the catalyst did not contain heavy metal contamination, no heavy metals are contained in the water after regeneration or if the subsequent use of the water is not sensitive to heavy metal contaminants, the heavy water treatment is not necessary. Treating the used regenerating water without a heavy metal treatment is not found patentable over the prior art.

Immersing the catalyst into water until bubbling stops is also held to be obvious in view of Dittmer '826. It would be obvious to immerse the catalytic converter in water for an effective amount of time, whether or not it is coincidental with the time of bubbling. One of the pretreatment steps in Dittmer '826 is also taught to allow liquid to enter the porous structure of the catalytic converter in order to loosen the contaminants in the material. (col 2, lines 10-15) Liquid entering a porous structure that was originally used in a gaseous environment, such as a NO_x converter, should cause bubbling, and thus a complete immersion would be indicated by the cessation of bubbling.

It would also be obvious to assess the catalyst before reinstallation into a flue gas apparatus. One of ordinary skill in the art would at least periodically assess the effectiveness or quality of a catalyst before reinstalling a regenerated catalyst into an apparatus since catalysts need to be replaced from normal use even if almost fully regenerated. One would be motivated to test the catalytic performance of the catalyst

before installing in order to avoid having to manipulate a large industrial process if it is found later that the catalyst reinstalled was no longer effective. Assessing the catalyst before reinstallation could involve another isolated apparatus without dealing with the general, possibly continuous, industrial process. Therefore it would be obvious to test catalyst activity before installation in order to avoid putting an ineffective catalyst into the main operations.

Regarding not drying the catalyst, it would have been obvious to one of ordinary skill in the art to install the catalyst without drying in order to save time and money. Dittmer '826 teaches that the drying chamber is at a temperature of 200-400ºC (claim 13) and that the NO_x removal process usually takes place at about 300-400ºC. One of ordinary skill in the art would have appreciated the possibility of using just the flue gas which needs NO_x to be removed to dry the catalyst in order to eliminate an additional drying step.

The use of regeneration water for a plurality of regeneration steps is also found to be obvious to one of ordinary skill in the art. It would be obvious to use the regeneration water as many times as possible before treatment as long as it was found to be effective in order to save on costs in water treatment. Since the process taught in Dittmer '826 involves movement of catalytic converters by way of crane (col 3, lines 49-50; col 4, lines 27-28; 48-49) it is feasible that the water remains in the basins while converters are continuously changed and brought from one basin to the other. In addition, Dittmer '826 teaches the treatment of catalytic converters, plural, being introduced into the basin for desired effects (col 3, lines 63-65), suggesting that multiple

converters are treated at the same time, which would meet the instant claims stating that the regeneration water is used for regenerating another NO_x removal catalyst. Therefore, the use of regeneration water a plurality of times is found to be obvious.

Optionally, Schneider '254 teaches a method for cleaning and/or regenerating a deactivated catalyst for use in nitrogen scrubbing. The method utilizes demineralized water. (abstract) The water is used to dissolve and remove the surface layer of the catalyst. (col 3, lines 5-8) The cleaning and regeneration of the catalytic devices is performed at ambient temperatures. (col 3, lines 20-22) Schneider '254 also teaches a process, represented by Figure 3, where the catalysts are contacted with demineralized water in a scrubber (6) and the used regenerating fluid is sent to a separator (8) and later a settling tank (9) with the overflow of liquid sent through lines (12, 13) directly back into the tank for desalinated water (11) where it is sent back as regenerating fluid to the scrubber (6). Water which is particularly contaminated with solids are taken from the bottoms of the settling tank (9) and sent through a line (10) to a water treatment plant. (described col 4, lines 10-33) The catalyst may be dried using stack gas or hot air. (col 4, lines 58-59)

A regenerating step at ambient temperatures and the use of regenerating water a plurality of times is found to be obvious in view of Schneider '254. The regeneration with demineralized water is performed at ambient temperatures so that no further heating step is necessary. (col 3, lines 21-23) One would be motivated to perform the step at ambient temperatures in the process taught in Dittmer '826 in order to reduce

heating costs. The use of regenerating water a plurality of times is also taught in Schneider '254 in that overflow effluent from the scrubbing process is sent right back with fresh water to another scrubbing step. One would be motivated to reuse regenerating water as much as possible in order to reduce costs. Schneider '254 teaches that low consumption of regenerating fluid is an advantageous goal. (col 4, lines 59-61)

Regarding not drying the catalyst before installation, Schneider '254 does teach the use of stack gas or hot air to dry. Flue gas is a kind of stack gas and thus it would be obvious to one of ordinary skill in the art to simply place the catalyst back into the system, so that it may be dried as well as begin catalyzing the removal of NO_x gases as soon as it is suitable. This would reduce time and money spent on the regeneration process.

Therefore, a regeneration step at an ambient temperature, the use of regeneration water a plurality of times as taught in Schneider '254, and not drying the catalyst before reinstallation is found to be obvious for use in Dittmer '826 in order to save costs and resources.

Claims 1-11 are not found patentable over the prior art.

6. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittmer '826 and optionally Schneider '254 as applied to claims 1-11 above, and further in view of Sueyoshi, et al. (JP 53-125964).

Dittmer '826 is silent as to how the catalyst is oriented when it is installed into a NO_x removal apparatus. Dittmer '826 does not teach that the catalyst is inverted with respect to the direction of the flow of discharge gas when it is installed after regeneration.

JP '964 teaches an apparatus wherein a catalyst unit is placed in a device so that it can be easily inverted in order to ensure even deterioration of the catalyst. (page 2, left column, last paragraph) It would be obvious to incorporate this technique into the process of Dittmer '826 in order to have the catalyst wear down more uniformly. One would be motivated to include catalyst inversion when installing in the process of Dittmer '826 improve the overall health and lifetime of the catalyst and also the uniformity of reaction. Therefore, claims 12-15 are not found patentable over the prior art.

Response to Arguments

7. Applicant's arguments filed 8/07/2008 have been fully considered but they are not persuasive.

Applicant argues that the step of "removing water" without drying the catalyst is not a contradictory statement because removing water refers to draining the residual water. Applicant refers to a statement on page 18 of the specification were the catalyst layer is "removed from regeneration water". There is a distinction between if the catalyst is removed from the water, and water is removed from the catalyst. Since the type of drying step which is excluded is not defined, and many water removal

techniques such as spin drying and evaporation, the scope of water removal techniques and drying techniques overlap too substantially to create a definite scope for the claims. As evidence of the common equivalent of removing water and “drying”, the definition from Merriam-Webster’s Online Dictionary of the adjective “dry" is provided. (The verb form of “dry” was simply given as “to make dry.”) As can be seen from the first definition, “(a) free or relatively free from a liquid and especially water,” the removal of water is closely and nearly completely equivalent to drying. Therefore, lacking a clear definition of “drying” the specification, the rejection is maintained.

Applicant argues that the NO_x removal step of the invention requires 1-30 minutes at ambient temperature while the prior art does not disclose such a length of time. However, as discussed earlier, the amount of time for treating is not found to be patentable over the prior art. No unexpected degree of decontamination is claimed, and thus the immersion time is a matter of optimization. Applicant also argues that the prior art may contain other chemicals in the water and also utilizes ultrasonic treatment. However, these are not excluded by the scope of the claims. The other chemicals in the water as disclosed by Dittmer are optional, thus leaving the suggestion of not using any additives at all. The ultrasonic treatment is also an additional process step, which is not excluded by the instant claims.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 8:00am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

DJL